Giant Bubbles

Grades: K-5

Subject: Surface tension, molecules, attraction

NGSS: PS4.A: Wave Properties
PS2.B: Types of Interactions

Skills: Active listening, critical thinking, observation

Materials: Bubble solution, wire coat hanger, shallow tub or tray, yarn (optional)

BACKGROUND

Surface tension refers to the strong attraction between water molecules. When droplets of water form, it is because water molecules are naturally attracted to each other. When soap is added to water, a chemical reaction occurs so that the surface tension, or attraction between water molecules, lessens. Bubbles are able to form because the lowered surface tension allows the molecules to spread out. Still, the water molecules are attracted to each other, and the bubble will pull as tightly as it can, like a stretched balloon, so that the molecules can stay close together.

ACTIVITY

1. Before the activity begins, bend the coat hanger into a flat hoop with the hook sticking up at an angle to use as a handle. If you have trouble picking up soap with the hanger, you can wrap yarn around the metal.

2. Go over the background information with your students and read Laura Bassi's section in *Women in Physics*.

3. Fill the shallow tray with bubble solution and submerge the hoop in it. Gently lift the hoop from the tray then swing it through the air. To close the bubble, twist the hoop to seal it off.

4. Ask students to describe the shape of the bubbles and the various patterns and colors they see inside.

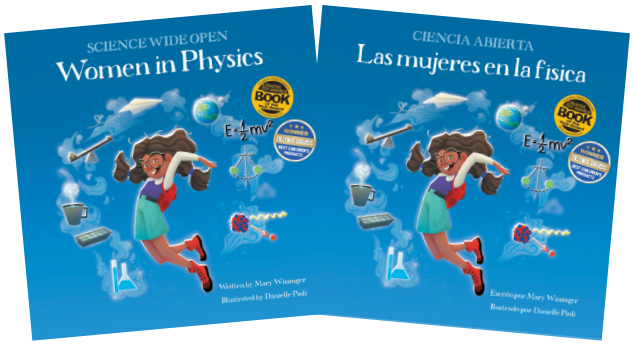
EXPAND THE ACTIVITY

Give students a penny, a pipette, and a cup of water for another activity on surface tension. Tell students to slowly place drops of water on a penny. Have them count the number of droplets that can fit on the penny's surface. What number is too many? At some point, the attraction of the water molecules will not be strong enough to overcome gravity.

ADDITIONAL INFORMATION

Ask your students what kind of colors they see in the bubbles. Light waves are reflected by the soap and water differently. The thicker the layer of soap, for example, the more red light will be absorbed, meaning that only blue and green colors will appear.

Information and Activity adapted from the Exploratorium website.



This activity is an excerpt from the Teacher's Guide to:
Women in Physics
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Irène Joliot-Curie

France

Chemist, physicist

Most known for her discovery of induced, or artificial, radioactivity

In Her DNA

Joliot-Curie was the daughter of Marie and Pierre Curie. Together with her husband, Frédéric Joliot-Curie, she was awarded the Nobel Prize in Chemistry for their discovery of artificial radioactivity. This made the Curies the family with the most Nobel laureates—five in total. Marie Curie received two, her husband one; the Joliot-Curies won one; and her second daughter was the director of the United Nations Children's Fund (UNICEF) when it won a prize in 1965

Wartime

World War I interrupted Joliot-Curie's college studies. When she was 18, she joined her mother in supporting wartime efforts. Marie Curie had established 20 mobile field hospitals equipped with X-ray equipment she had developed. Joliot-Curie ran the hospitals for her as they both served as nurses and radiographers. Unfortunately, their exposure to radiation—in the hospitals and their research—caused the mother and daughter duo to have many health issues, which they both eventually passed away from

Power Couple

Joliot-Curie met her husband, Frédéric, in a radiochemical laboratory. They combined their research together and focused on studying nuclei (the plural of nucleus) in atoms. In 1934, the couple discovered how to create radioactive material from stable elements

An Important Discovery

The Joliot-Curie's discovery of how to create radioactive material was a very helpful and timely scientific breakthrough. Partly due to Marie and Pierre Curie's research, the use of radiation in medicine and technology was rapidly growing. Artificial radioactivity allowed people to make materials quickly and cheaply. Their research also led to the discovery of nuclear fission, which is now used to create clean energy